



European Commission



Information Society

Robotics in the IST Programme

21st JCF Meeting

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DG Information Society, European Commission



Disclaimer

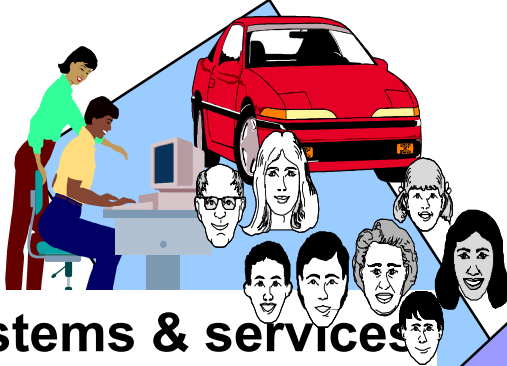
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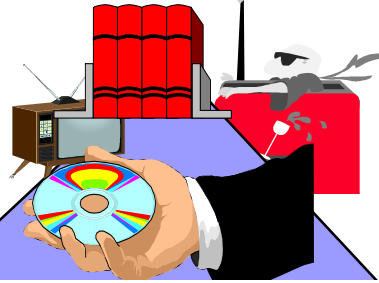
IST-FP5

1999-2002, 3.6 billion Euro



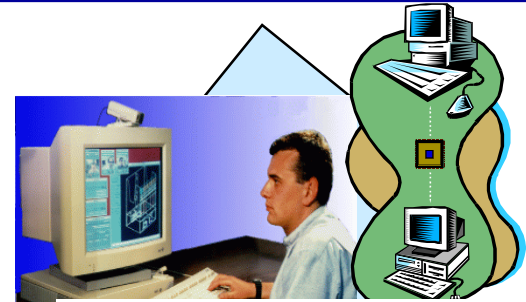
**Systems & services
for the citizen**

646 MEuro



**Multimedia
content & tools**

564 MEuro

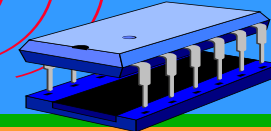


**New methods of working
& electronic commerce**

547 MEuro

**Essential technologies
& infrastructures**

1363 MEuro



Future & emerging technologies

319 MEuro

Research networking

161 MEuro

www.cordis.lu/ist/home.html

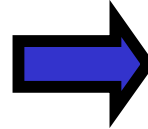




Robotics in IST-FP5:

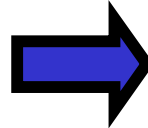
Areas of Activities

**Systems and services
for the citizen**



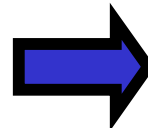
- Health Monitoring
- Aid to Persons with Special Needs
- Risk Management (Demining)
- Transport and Tourism

**Multimedia content
and tools**



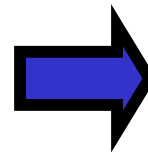
- Cultural Heritage

**Essential technologies
and infrastructures**



- Cognitive Vision Systems
- Software Systems
- Simulation and Interfaces
- Micro- and Nano-Systems

**Future & Emerging
Technologies**



- Basic Research in Robotics
- Neuro-informatics
- Life-like Perception Systems





Robotics in IST-FP5:

An overview



Number of projects	Total Cost	Total EC Funding
47	~125 M Euro	~80 M Euro

Some specific robotics-related activities

- **In 2000, two Calls for proposals on**
 - Humanitarian demining
 - Neuro-informatics
- **In 2001, one Call for proposals on**
 - Life-like perception systems
- **In 2002, one Call for proposals on**
 - Cognitive Vision Systems





Examples of Robotics Projects in IST-FP5

- **10762 ROBOVOLCIST:** Robot exploring volcanic environments
- **11683 SAFIRA:** Affective human machine interfaces
- **11976 ROBOSENSE:** Climbing robot for seismic risk assessment
- **12643 TOURBOT:** Interactive museum tele-presence through a robotic avatar
- **11421 DIVIPRO & 11979 REALSIM:** RT simulation for robotic design
- **13109 REHAROB:** Robotic rehabilitation system
- **26048 EURON:** European Robotics Research Network
- **31064 OROCOS:** Open source standard platform for robotics software
- **32516 OTELO:** Portable U/S probe holder robot

for more information:

http://dbs.cordis.lu/search/en/simple/EN_PROJ_simple.html





IST 2000 Call

“Humanitarian Demining”

- **IST Action Line** “Data fusion and smart sensor technologies for Humanitarian Demining”
- **Objective** The work aims at new and enhancement of existing IST solutions, to improve significantly and at affordable costs the speed, safety and efficiency of humanitarian de-mining (e.g. surveying, detection, clearance and post clearance). The most promising emerging sensor technologies are to be investigated, addressing the needs of humanitarian demining.
- **Results of the Call**
 - 8 projects, ~16 million Euro EC funding
- **Examples of projects**
 - **25044 SMART** (a multisensor minefield survey system)
 - **25300 ARC** (helicopter UAV for minefield area detection)
 - **26419 BULRUSH** (a vehicle-based sensor system for demining in water)





IST 2000 Call

“Neuro-informatics”

- **IST Action Line** “Neuroinformatics for living artefacts
- **Objective** To explore new synergies between Neurosciences and Information Technologies in order to enable the construction of hardware/software “artefacts that live and grow”, i.e. artefacts that self-adapt and evolve beyond pure programming
- **Results of the Call**
 - 9 projects, ~14 million Euro EC funding
- **Examples of projects**
 - **28127 AMOUSE** (robotic system with an artificial mouse-like tactile system)
 - **28159 MIRROR** (robotic system with body gesture communications and with human visuomotor inspired representation and learning of manipulation acts)
 - **29689 ARTESIMIT** (an artificial hand learning complex action sequences)





IST 2001 Call



“Life-like perception systems”

- **IST Action Line** “Life-like perception systems”
- **Objective** To create integrated perception-action systems that are inspired by the sophistication of solutions adopted by living systems. “Perception is meant to include sensorial, cognitive, and control aspects, whether it refers to vision or hearing, or to any other element of interaction with the environment by a biological organism. Such systems would extend the capabilities of machines or be used to augment the human senses
- **Call results**
 - 6 projects, ~10 million Euro EC funding
- **Examples of projects**
 - **34181 BIOLOCH** (understanding motion and perception systems of lower animal forms and conceiving bio-inspired micro machines)
 - **35282 MIRRORBOT** (biomimetic multimodal learning using a mirror-neuron-based robot to investigate the task of foraging for objects)
 - **33564 NEUROBIT** (connecting portions of living nervous tissue with a robot for teaching the biological component how to process information)





IST 2002 Call

“Cognitive Vision Systems”

- **IST Action Line** “Cognitive Vision systems”
- **Objective** To develop robust cognitive vision systems acquiring and using knowledge for decision making. The focus is on adaptive systems, real-time platforms and vision architectures permitting the development of novel computational frameworks, integrating multiple cues for scene modelling and capable of recognising large numbers of different objects. Approaches to achieving cognition such as temporal reasoning and incremental learning should be addressed
- **Call results**
 - 8 projects, ~17 million Euro EC funding
- **Examples of projects**
 - **29375 COGVIS** (task-oriented categorisation and recognition of objects and events in the context of an embodied agent)
 - **29404 COGVISYS** (a virtual commentator able to translate visual information into a textual description)





The 6th Framework Programme (2003-2006) - 16.3 Billion Euro



INTEGRATING EUROPEAN RESEARCH								
PRIORITY THEMATIC AREAS							ANTICIPATING S/T NEEDS	
Genomic and biotechnology for health	Information society technologies	Nanotechnologies, intelligent mat., new production processes	Aeronautics and space	Food safety and health risks	Sustainable development and global change	Citizens and governance in the knowledge society	Research for policy support	Frontier research, unexpected developments
							Specific SME activities	
							Specific international cooperation activities	
							JRC activities	

STRUCTURING THE ERA			
Research and innovation	Human resources & mobility	Research infrastructures	Science and society

STRENGTHENING THE FOUNDATIONS OF ERA	
Coordination of research activities	Development of research/ innovation policies





FP6 Budget Breakdown

● Focussing and Integrating

- Genomics 2255 M€
- Information Society Technologies 3625 M€ → ~100M€ for GEANT/GRID
- Nanotechnologies, int.. 1300 M€
- Aeronautics and space 1075 M€
- Food quality and safety 685 M€
- Sustainable development 2120 M€
- Citizens and governance .. 225 M€
- Anticipation of S&T needs
 - Anticipating needs 555 M€
 - SMEs 430 M€
 - Specific INCO 315 M€

● Strengthening ERA foundations 320 M€

● Structuring ERA

- Research and Innovation 290 M€
- Human resources 1580 M€
- Research Infrastructures 655 M€ → ~200M€ for GEANT/GRID
- Science/Society 80 M€

● Joint Research Centre

760M€

16270 M€





IST-FP6

(Budget: ~4 Billion Euro)

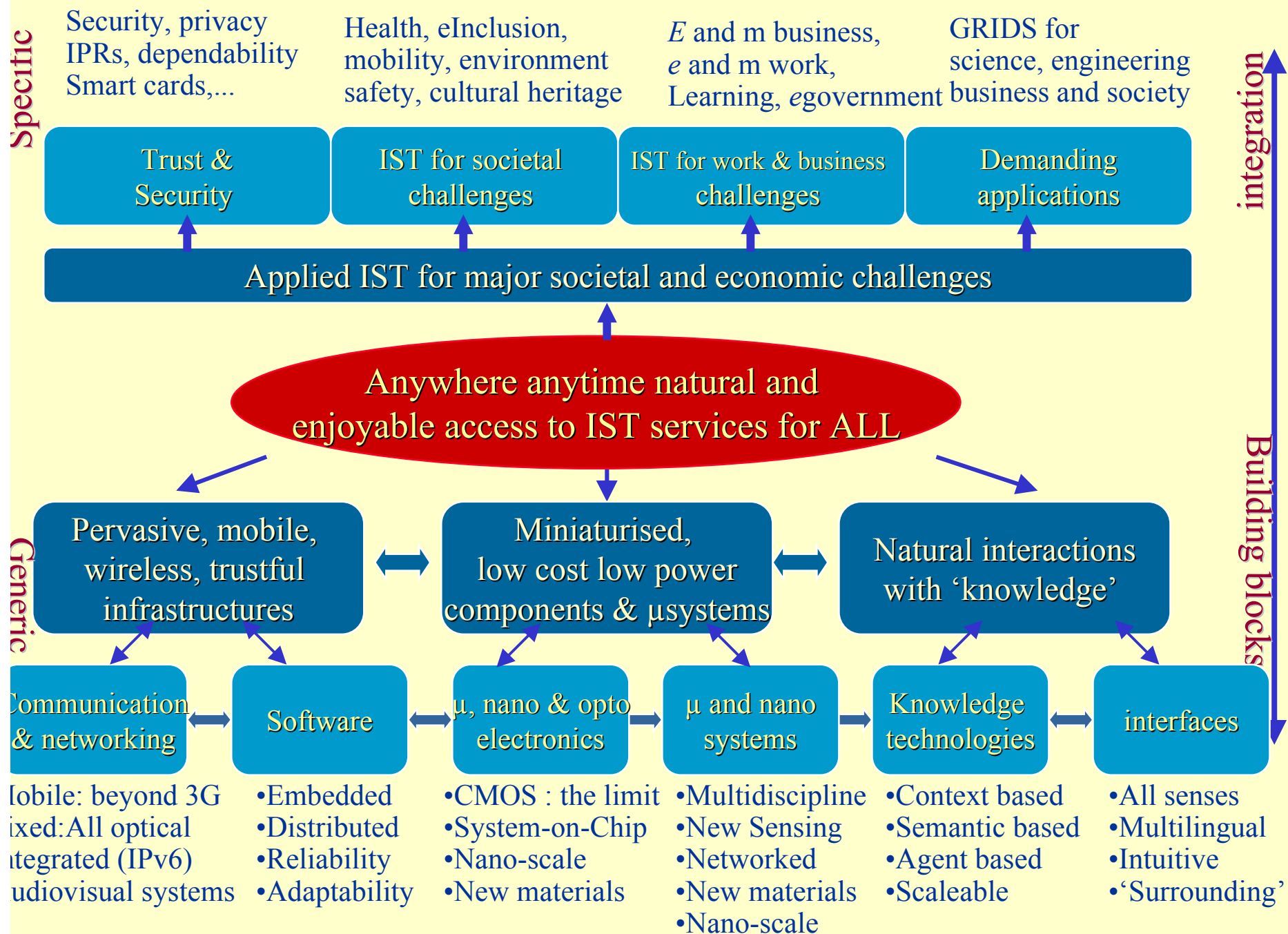
**Communication
and
computing
infrastructures**

**Components
and
micro-systems**

**Knowledge and
interface
technologies**

Applied IST research addressing major societal and economic challenges





Security, privacy
IPRs, dependability
Smart cards,...

Health, eInclusion,
mobility, environment
safety, cultural heritage

E and *m* business,
e and *m* work,
Learning, *e*government

GRIDS for
science, engineering
business and society

Trust &
Security

IST for societal

IST for work & business

Demanding

FET in IST-FP6

- Exploring new paradigms and visions at the limit of knowledge
 - **IST's pathfinder activity**
 - **A "nursery" of new ideas**
- Open scheme and proactive initiatives

Pervasive
wireless
infrastructure

Communication
& networking

Mobile: beyond 3G

• Embedded

• CMOS : the limit

• Multidiscipline

• Context based

• All senses

Fixed: All optical

• Distributed

• System-on-Chip

• New Sensing

• Semantic based

• Multilingual

Integrated (IPv6)

• Reliability

• Nano-scale

• Networked

• Agent based

• Intuitive

Audiovisual systems

• Adaptability

• New materials

• New materials

• Scaleable

• 'Surrounding

• Nano-scale



Robotics in IST-FP6

Beyond Robotics Initiative in FET

Objectives

- **Cognitive robots: ‘assistants’ or ‘companions’ to humans**
 - open-ended conceptual learning of new skills and tasks
 - in constant interaction and co-operation with humans
- **Hybrid bionic systems**
 - augmenting human interaction and perception of the environment
 - smooth integration with human perception-action systems
- **Autonomous microrobot groups (‘robot ecologies’)**
 - heterogeneous members with collective behaviour and intelligence
 - attain a global objective (self-organise, adapt, co-operate and evolve)

Open in IST-FP6 Call 1 (December 2002)





Robotics in IST-FP6

Cognitive Systems

Objective

To construct physically instantiated or embodied systems that can perceive, understand (the semantics of information conveyed through their perceptual input) and interact with their environment, and evolve in order to achieve human-like performance in activities requiring context- (situation and task) specific knowledge.

Focus

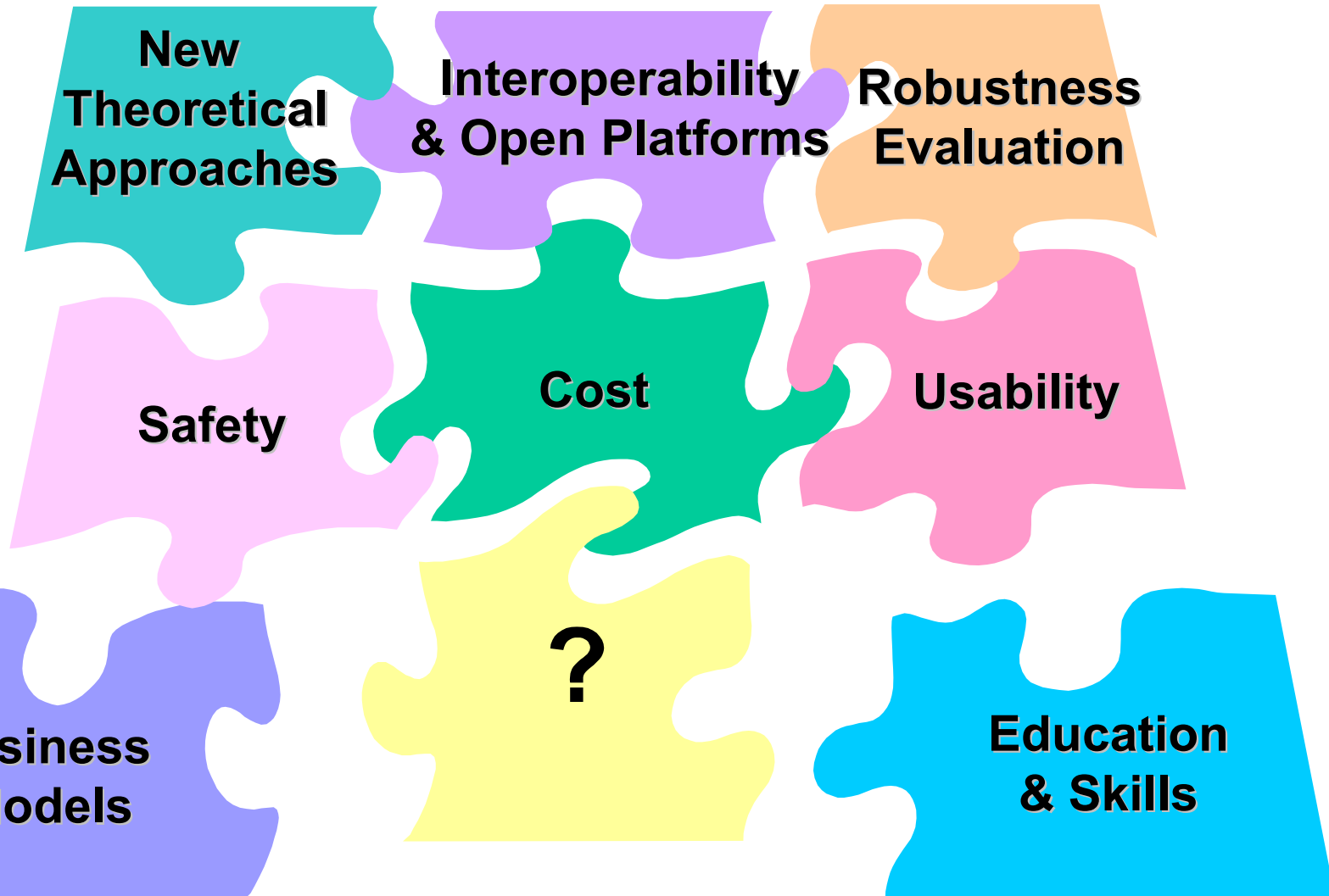
- **Methodologies and construction of robust and adaptive cognitive systems**

Main target: interdisciplinarity!

Open in IST-FP6 Call 2 (summer 2003)



Robotics Challenges





Information on IST

- **DG-Research FP6 web main page**
http://europa.eu.int/comm/research/fp6/index_en.html
- **CORDIS RTD beyond 2002**
<http://www.cordis.lu/rtd2002/>
- **IST on CORDIS**
<http://www.cordis.lu/ist/>
- **IST in FP6**
<http://www.cordis.lu/ist/fp6/fp6.htm>



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